WHAT IS CLAIMED IS:

1. A method of fabricating an optical device having at least one integrated waveguide and at least one micro-machined feature, comprising:

depositing a mask layer over a surface of a substrate structure, and patterning the mask layer to obtain a mask pattern over the surface of the substrate structure; and

conducting a first etching process for obtaining the at least one integrated optical waveguide core at the surface of the substrate structure, and conducting a second etching process for obtaining the at least one micro-machined feature at the surface of the substrate structure, wherein the mask pattern is used as a mask in both the first and second etching processes.

2. The method as claimed in claim 1, wherein the mask layer is planar.

3. The method as claimed in claim 1, wherein the at least one micro-machined feature is an inclined surface etched into the surface of the substrate structure.

4. The method as claimed in claim 1, wherein the at least one micro-machined feature is a groove etched into the surface of the substrate structure.

5. The method as claimed in claim 1, wherein the mask layer is a metal.

6. A method of fabricating an optical device, comprising:

forming a lower cladding material layer within a recess of a substrate;

forming a core material layer over the lower cladding material layer and a surface of the substrate;

patterning a first mask layer over the core material layer, wherein the first mask layer is patterned such that a first portion is extends over the lower cladding material layer, and such that a second portion extends over the surface of the substrate adjacent to the lower cladding material layer;

etching away the core material layer using the first mask layer as a mask such that a first core material portion remains below the first portion of the first mask layer and a second core material portion remains below the second portion of the first mask layer;

removing the first portion of the first mask layer to obtain a resultant structure and depositing an upper cladding material layer so as to cover a surface of the resultant structure;

patterning a second mask layer over the upper cladding material layer, wherein the second mask layer extends across the lower cladding material layer and has an end which is aligned with and partially overlaps the second portions of the first mask layer;

etching away the upper cladding material layer using the second mask layer as a mask to expose a part of the second portion of the first mask layer; and

etching away portions of the substrate using the exposed part of the second portion of the first mask layer as a mask.

7. The method as claimed in claim 6, wherein the first mask layer is planar.

8. The method as claimed in claim 6, wherein the first mask layer is formed of a metal.

9. The method as claimed in claim 6, further comprising depositing a silicon nitride layer on the surface of the substrate prior to forming the core material layer over the lower cladding material layer and the surface of the substrate.

10. The method as claimed in claim 6, wherein the portions of substrate are etched away to define an inclined surface feature in the substrate.

11. The method as claimed in claim 10, further comprising:

patterning a third mask layer having a first portion which covers the inclined surface feature of the substrate and a second portion which extends over the upper cladding material layer; and

etching away the second portions of the first mask layer, the second portions of the core material layer, and exposed portions of the upper cladding material layer using the third mask layer as a mask.

12. A method of fabricating an optical device, comprising:

forming a lower cladding material layer within a recess of a substrate;

forming a core material layer over the lower cladding material layer and a surface of the substrate;

patterning a first mask layer over the core material layer, wherein the first mask layer is patterned such that a first portion is extends lengthwise over the lower cladding material layer, and such that a second portion extends over the substrate surface adjacent to the lower cladding material layer and defines an elongate opening which is aligned in a lengthwise direction with the first portion of the first mask layer;

etching away the core material layer using the first mask layer as a mask such that a first core material portion remains below the first portion of the first mask layer and a second core material portion remains below the second portion of the first mask layer;

removing the first portion of the first mask layer to obtain a resultant structure and depositing an upper cladding material layer so as to cover a surface of the resultant structure;

patterning a second mask layer over the upper cladding material layer, wherein the second mask layer extends across the lower cladding material layer and has an end which is aligned with and partially overlaps the second portion of the first mask layer;

etching away the upper cladding material layer using the second mask layer as a mask to expose a part of the second portion of the first mask layer; and

etching away portions of the substrate using the exposed part of the second portion of the first mask layer as a mask.

13. The method as claimed in claim 13, wherein the first mask layer is planar.

14. The method as claimed in claim 12, wherein the first mask layer is formed of a metal.

15. The method as claimed in claim 12, further comprising depositing a silicon nitride layer on the surface of the substrate prior to forming the core material layer over the lower cladding material layer and the surface of the substrate.

16. The method as claimed in claim 12, wherein the portions of substrate are etched away to define an grooved surface feature in the substrate.

17. The method as claimed in claim 12, wherein the second portion of the first mask layer is defined by two parallel mask parts extending on opposite sides of the elongate opening.

18. The method as claimed in claim 17, wherein the second portion of the first mask layer is further defined by a third mask part which extends between ends of the two parallel mask parts.

19. A method of fabricating an optical device, comprising:

forming a lower cladding material layer within a recess of a substrate;

forming a core material layer over the lower cladding material layer and a surface of the substrate;

patterning a first mask layer over the core material layer, wherein the first mask layer is patterned such that a first portion is extends over the lower cladding material layer, and such that a second portion extends over the substrate surface adjacent to the lower cladding material layer;

patterning a second mask layer having an opening aligned over the lower cladding material layer;

etching away the core material layer using the second mask layer and the first portion of the first mask layer as masks, wherein a first portion of the first core material layer remains below the first portion of the first mask layer, and a second portion of the first mask layer remains below second mask layer;

removing the second mask layer and the first portion of the first mask layer to obtain a resultant structure and depositing an upper cladding layer so as to cover a surface of the resultant structure;

patterning a third mask layer over the upper cladding material layer, wherein the third mask layer extends across the lower cladding material layer and has an end which is aligned with and partially overlap the second portions of the first mask layer;

etching away the upper cladding material layer using the third mask layer as a mask to expose a part of the second portion of the first mask layer; and

etching away portions of the substrate using the exposed part of the second portion of the first mask layer as a mask.

20. The method as claimed in claim 19, wherein the first mask layer is planar.

21. The method as claimed in claim 19, wherein the first mask layer is formed of a metal.

22. The method as claimed in claim 19, further comprising depositing a silicon nitride layer on a surface of the substrate prior to forming the core material layer over the lower cladding material layer and the exposed surface of the substrate.

23. The method as claimed in claim 19, wherein the portions of substrate are etched away to define an inclined surface feature in the substrate.

24. The method as claimed in claim 23, further comprising:

patterning a fourth mask layer having a first portion which covers the inclined surface feature of the substrate and a second portion which extends over the upper cladding material layer; and

etching away the second portions of the first mask layer, the second portions of the core material layer, and exposed portions of the upper cladding material layer using the fourth mask layer as a mask.

25. A method of fabricating an optical device, comprising:

forming a lower cladding material layer within a recess of a substrate such that an upper surface of the lower cladding material layer is below a surface of the substrate;

forming a core material layer within the recess and over the lower cladding material layer;

patterning a first mask layer over the core material layer and a surface of the substrate, wherein the first mask layer is patterned such that a first portion extends over the core material layer, and such that a second portion extends over the surface of the substrate surface adjacent to the core material layer;

etching away the core material layer using the first portion of the first mask layer as a mask such that a first core material portion remains below the first portion of the first mask layer;

removing the first portion of the first mask layer to obtain a resultant structure and depositing an upper cladding material layer so as to cover a surface of the resultant structure;

patterning a second mask layer over the upper cladding material layer, wherein the second mask layer extends across the core material layer and has an end which is aligned with and partially overlaps the second portions of the first mask layer;

etching away the upper cladding material layer using the second mask layer as a mask to expose a part of the second portion of the first mask layer; and

etching away portions of the substrate using the exposed part of the second portion of the first mask layer as a mask.

26. The method as claimed in claim 25, wherein the first mask layer is planar.

27. The method as claimed in claim 25, wherein the first mask layer is formed of a metal.

28. The method as claimed in claim 25, further comprising depositing a silicon nitride layer on the surface of the substrate prior to forming the core material layer over the lower cladding material layer and the surface of the substrate.

29. The method as claimed in claim 25, wherein the portions of substrate are etched away to define an inclined surface feature in the substrate.

30. The method as claimed in claim 29, further comprising:

patterning a third mask layer having a first portion which covers the inclined surface feature of the substrate and a second portion which extends over the upper cladding material layer; and

etching away the second portions of the first mask layer, the second portions of the core material layer, and exposed portions of the upper cladding material layer using the third mask layer as a mask.